

CLAIMS

1. Aeration system for aeration and/or mixing of water, which comprises at least one aeration unit (20) having a pump/propeller (13) inside a feed pipe, with which propeller/pump the water is sucked into the feed pipe (14), and a feed pipe (14) to which the water to be aerated is sucked from beneath and a nozzle ring (15, 38) in the aeration unit (20), and which feed pipe (14) expands in the upper part of the aeration unit (20) by forming a conical space that works as a nozzle (17), which ends to at least one annular nozzle opening (18), characterized in that the aeration unit (20) is placed in the water to the right depth (22,23) in such a way that the water flow caused by the pump/propeller (13) goes to one or more of the annular nozzle openings (18) at or close to the surface of the water.
2. Aeration system of claim 1, characterized in that the nozzle opening (18) is vertical in order to bring the water jet horizontally out from the feed pipe (14).
3. Aeration system of claim 1, characterized in that the nozzle opening (18) slants diagonally upwards in order to bring the water jet diagonally upwards out from the feed pipe (14).
4. Aeration system of claim 1, characterized in that the conical space in the upper part of the aeration unit (29) is between the nozzle rings (15, 38).
5. Aeration system of claim 1, characterized in that there is another smaller propeller (40) in the upper part of the system, which other propeller is different handed compared to the propeller (13) of the propeller pump.
6. Aeration system of claim 1, characterized in that there is cylindrical covering (41) around the aeration unit (20).
7. Aeration system of claim 1, characterized in that a wedge-formed nozzle (17) is formed between the nozzle rings (15), which nozzle (17) ends to the annular nozzle opening (18).

8. Aeration system of claim 1, characterized in that the nozzle ring (15) of the aeration unit (20) is formed by a cover (38), which is externally fastened and the oxidation and/or mixing can be regulated by adjusting the position of the cover (38).
9. Aeration system of claim 1, characterized in that the nozzle (17) is divided into several nozzle openings by means of wedge-formed nozzle rings (15).
10. Aeration system of claim 1, characterized in that the conical space in the upper part of the aeration unit (20) has been achieved by cutting around the feed pipe, whereby the cutting results in a nozzle (17) and a nozzle opening (18).
11. Aeration system of claim 10, characterized in that the upper part and the lower part of the cutting of the feed pipe is of same piece and fastened to each other by fasteners left in the pipe.
12. Aeration system of claim 1, characterized in that there are several aeration units (20) and a transversal feed pipe or transversal feed pipes (28), along which the water is lead to the aeration units.
13. Aeration system of claim 11, characterized in that one feed pipe (14), pump (13) and motor (11) feed the water to several aeration units (20) simultaneously.
14. Aeration system of claim 11, characterized in that a part of the aeration units (20) can be shut by lowering the cover (38) and by lowering the pumping power at the same time by decreasing the rotation speed of the motor (11).
15. Aeration system of claim 1 and 11, characterized in that the transversal suction pipe (26) near the bottom and the suction holes (33) therein intensifies the mixing.
16. Aeration system of claim 1 and 11, characterized in that by changing the rotation direction of the propeller (13) and by keeping the aeration units (20) under

the water, the circulation and mixing of the water can be intensified and the apparatus can be cleaned.

17. Method for aeration/mixing of water in an aeration unit (20), which comprises a propeller/pump (13) inside a feed pipe, with which propeller/pump (13) the water is sucked into the feed pipe (14) and a feed pipe (14), to which the water is sucked from beneath and a nozzle ring (15, 38) of the aeration unit,

characterized in that

- a) a water stream achieved with the propeller pump (13) is lead to the feed pipe (14) of the aeration unit (20), which is in the water,
- b) the water is lead from the feed pipe via such a part in the upper part of the feed pipe that works as a nozzle (17) and extends as a conical space and is lead further to one or more annular nozzle openings (18) ending to the nozzle (17) at or near by the surface of the water,
- c) the water (16) is lead away via the nozzle opening (18) in the form of a water jet.

18. Method of claim 17, characterized in that when there is another smaller propeller (40) in the upper end of the system that is different handed compared to the propeller (13) of the propeller pump, a pre-aeration is performed as a first step, wherein water is pushed by the propeller (40) downwards and air is mixed with it, and the water is removed from the aerator via the nozzle (17) in the form of a water jet.

19. Method of claim 17 or 18, characterized in that when there is a cylindrical covering (41) around the aeration unit, the water jet from the nozzle (17) is, in the third step of the aeration, allowed to collide with the cylindrical covering (41) working as a wall in order to split the water jet into small water droplets and air bubbles.

20. Method of any of claims 17 - 19, characterized in that the apparatus is used for the circulation of water, whereby the apparatus is lowered so that the nozzles come under the water or by raising the covering (38) of the aerator and/or by lowering the rotation speed of the motor (11).